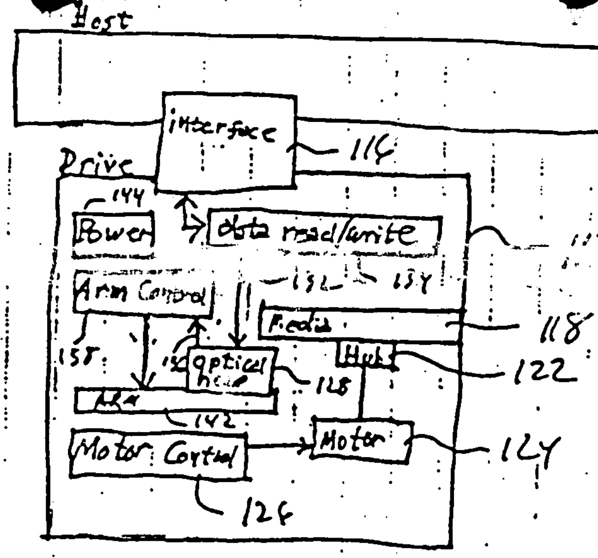


Fig 1

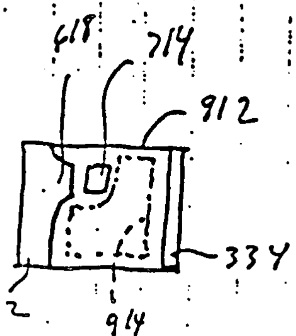


Fig 9

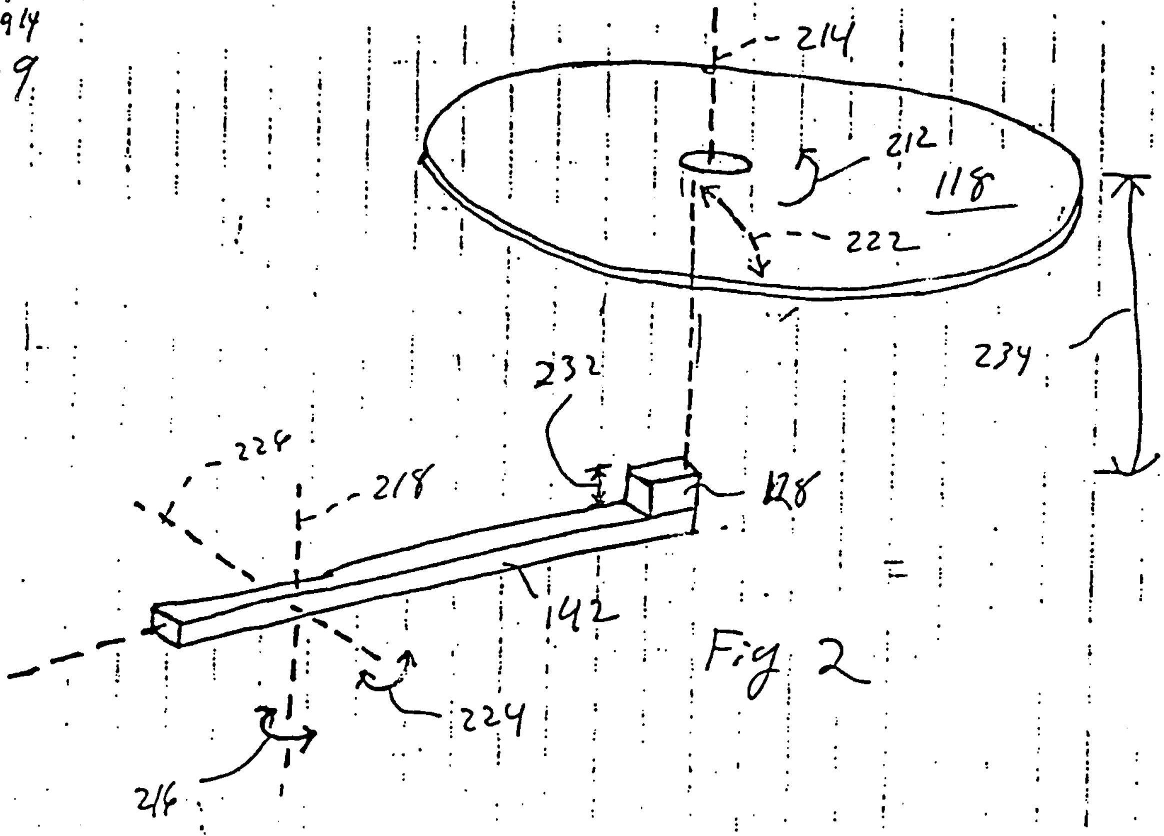


Fig 2

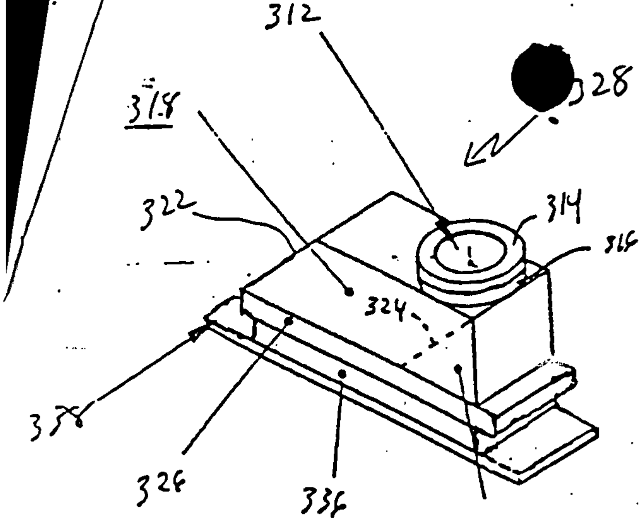


Fig3

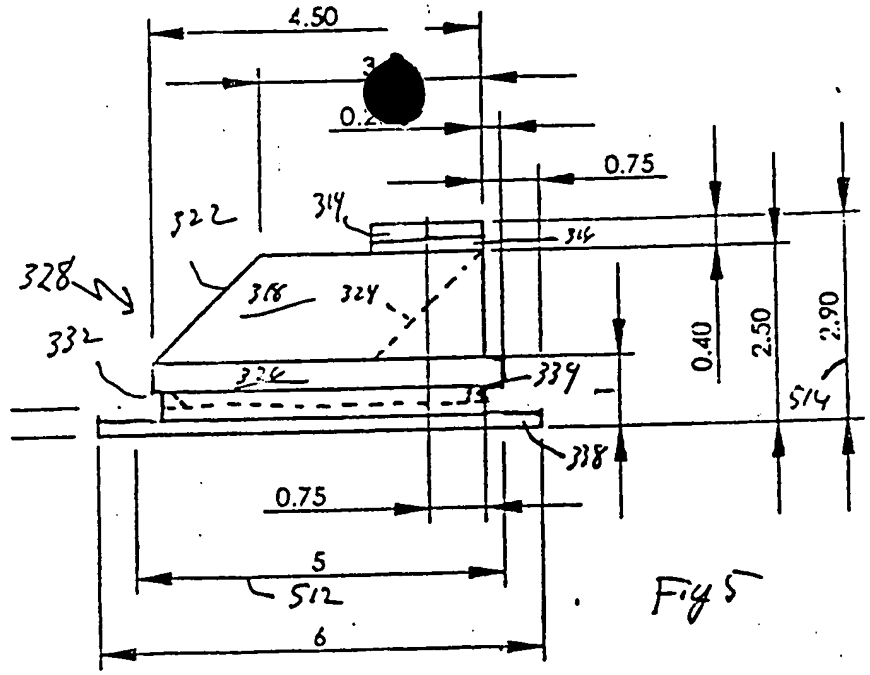


Fig5

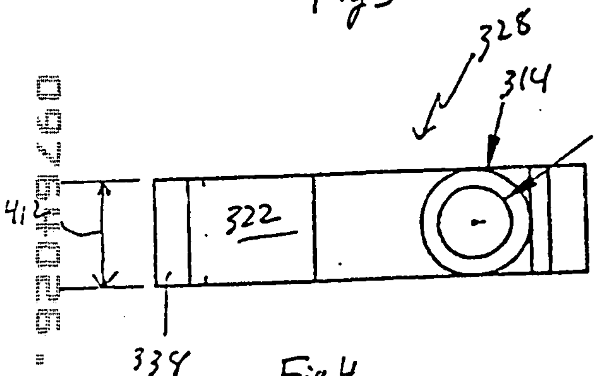


Fig 4

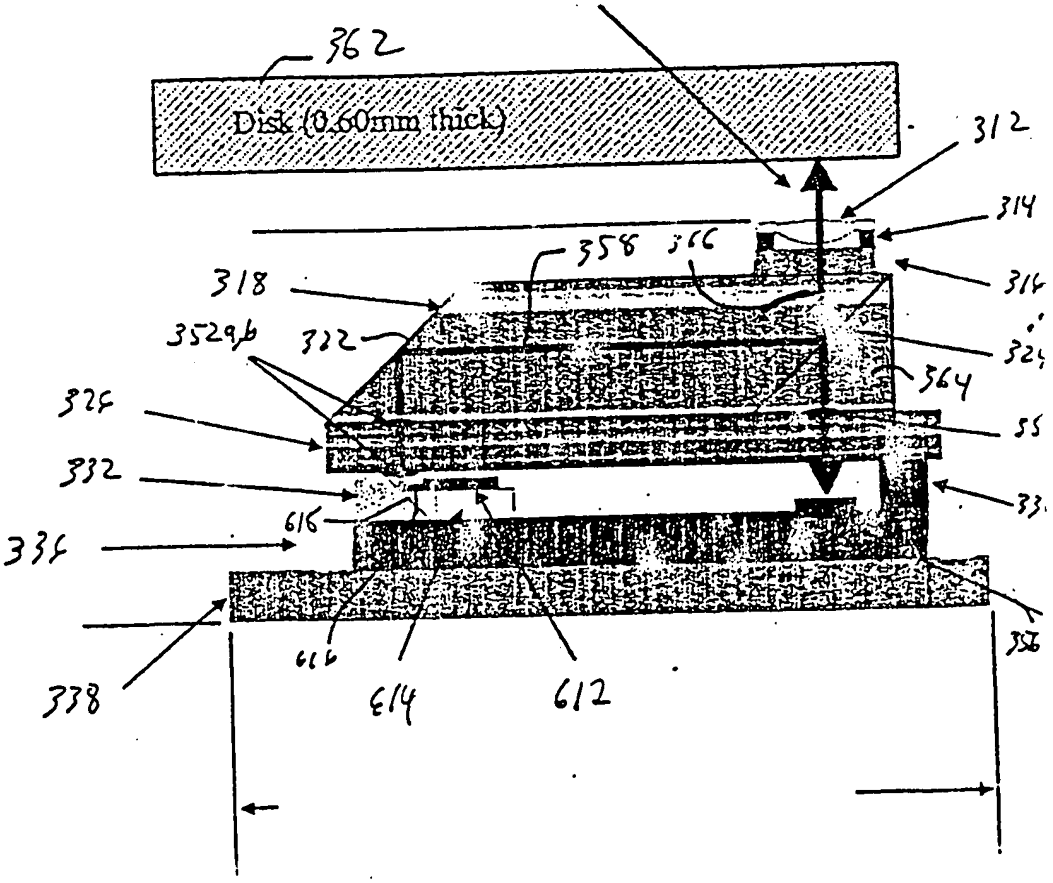


Fig 6

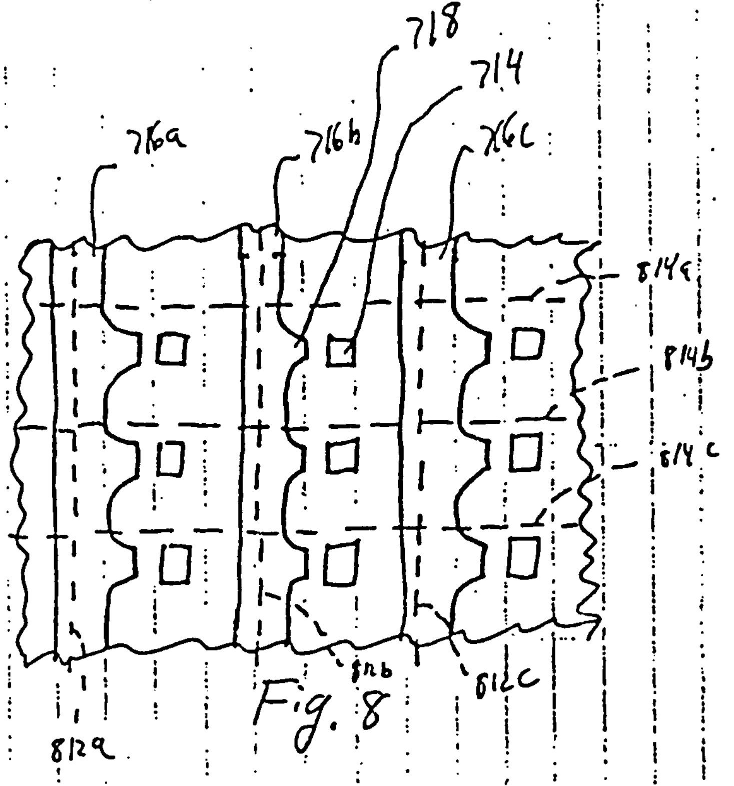

716a
716b
718
714
716c
814a
814b
814c
812a
812b
812c

Fig. 8

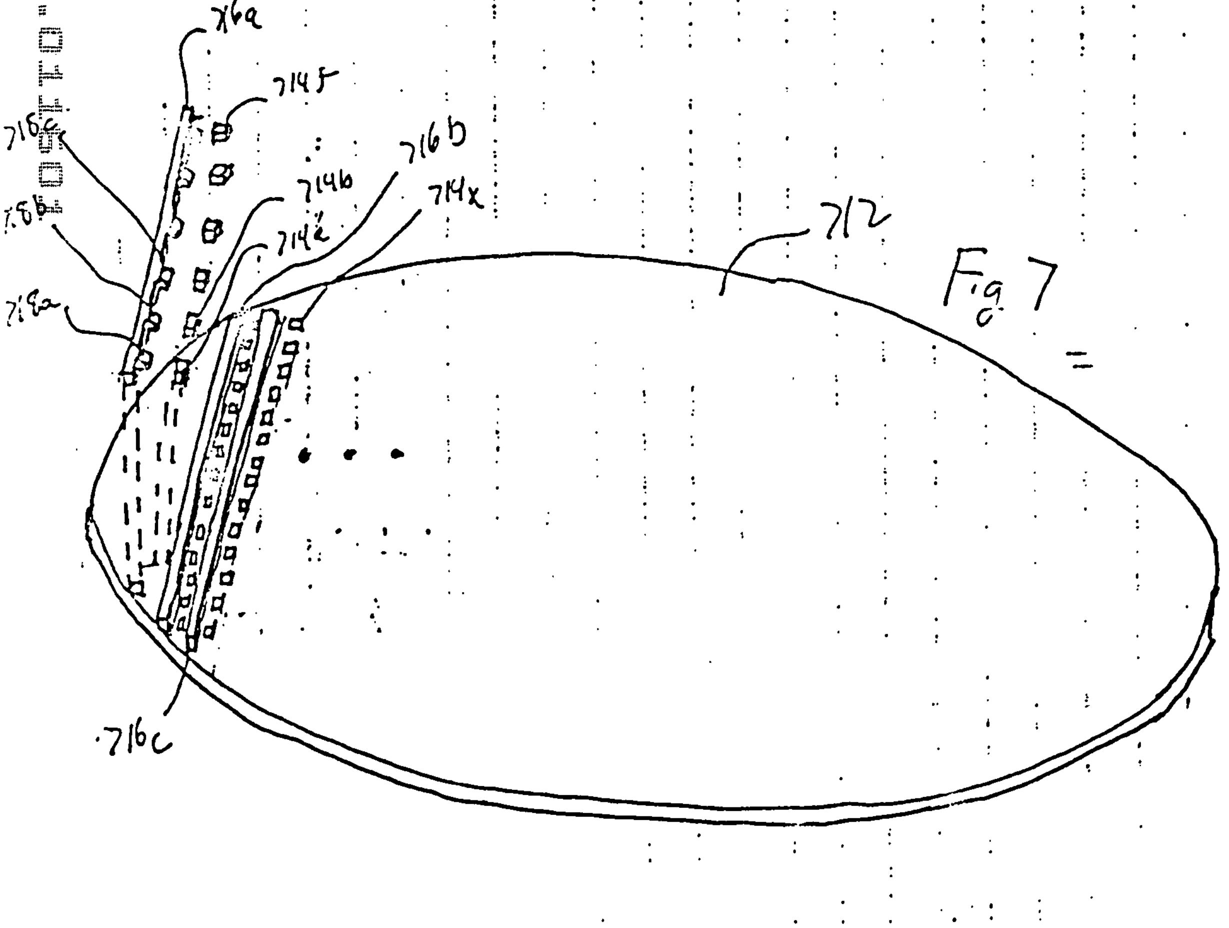

716a
714f
716a
718b
718a
714b
714e
716b
714x
712
716c

Fig 7

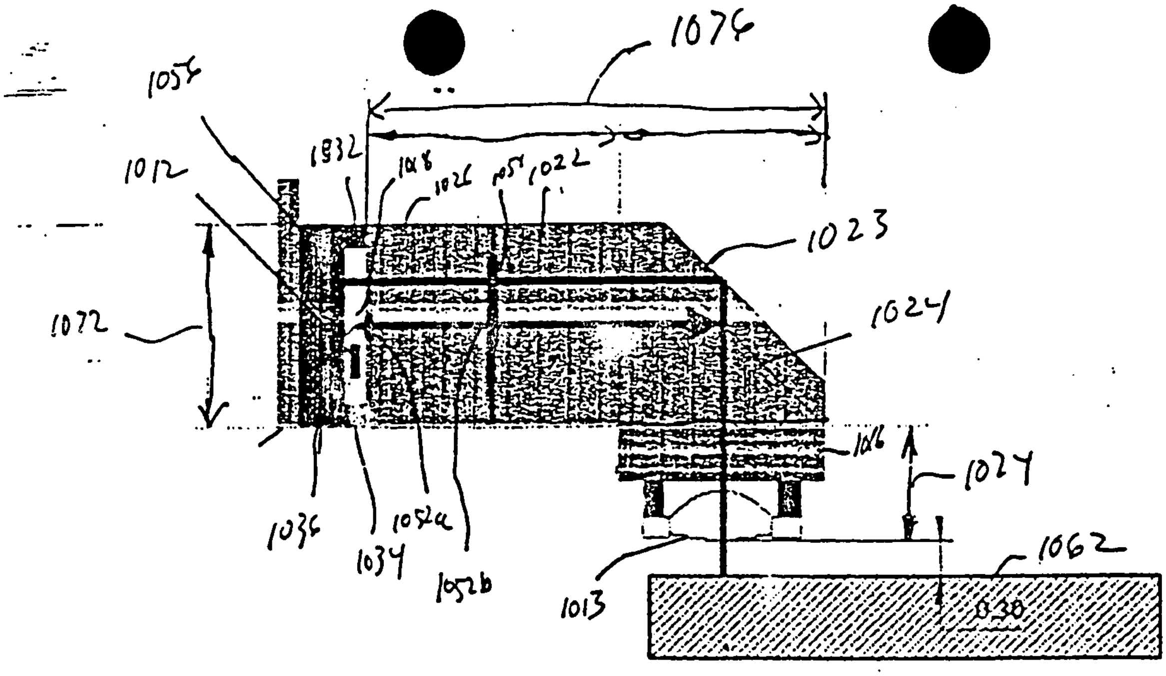

1076
1056
1012
1032
108
1026
1051
1022
1023
1024
1072
1036
1034
1052a
1052b
106
1027
1062
1013
030

Fig 10

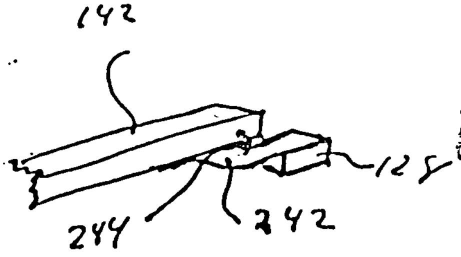


Fig ~~2B~~ 11

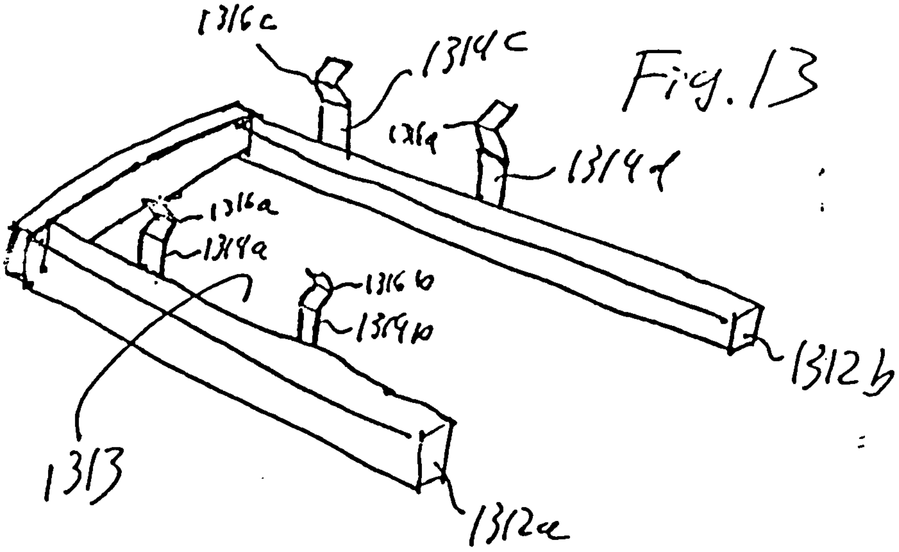
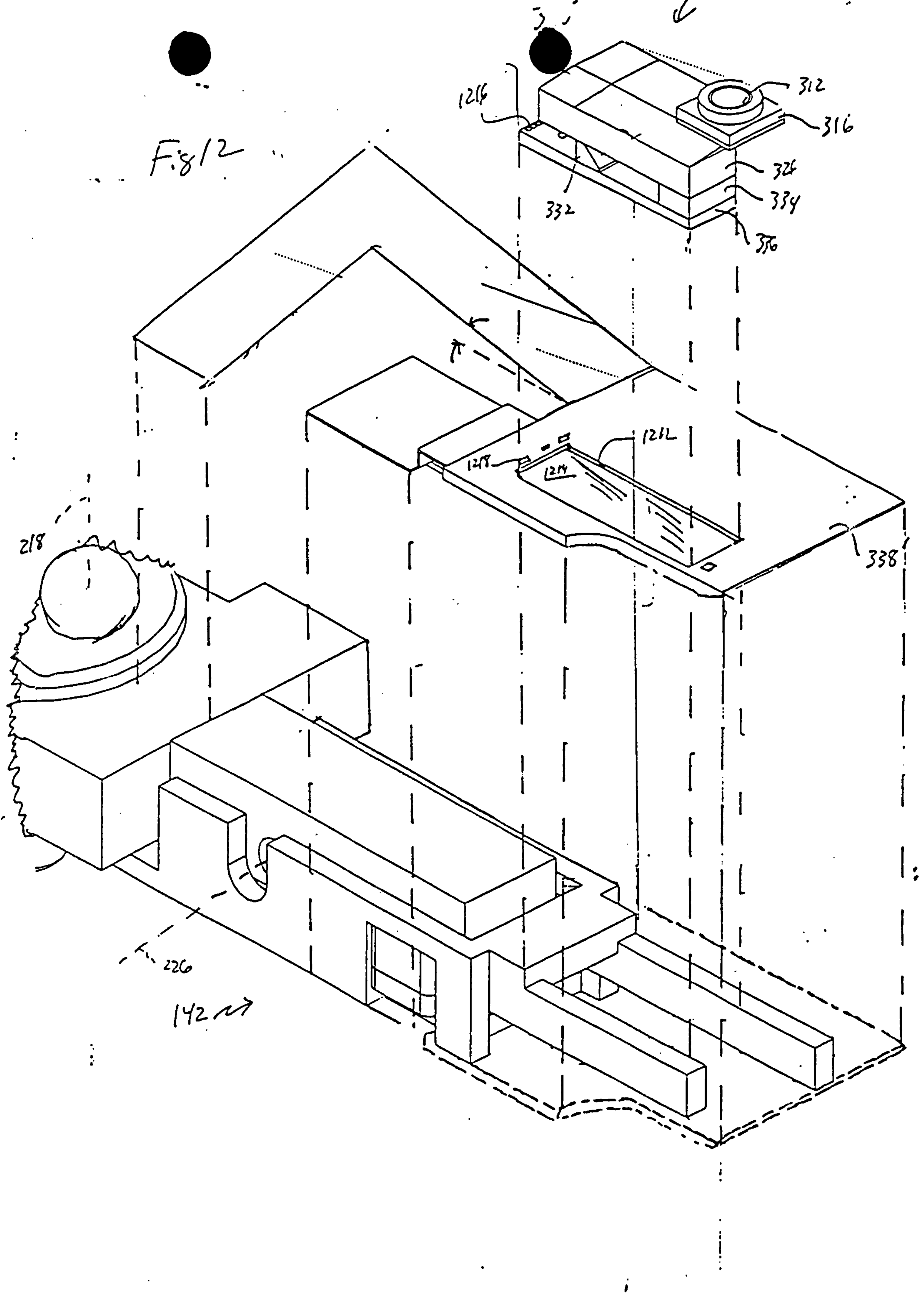


Fig. 13

Fig 12



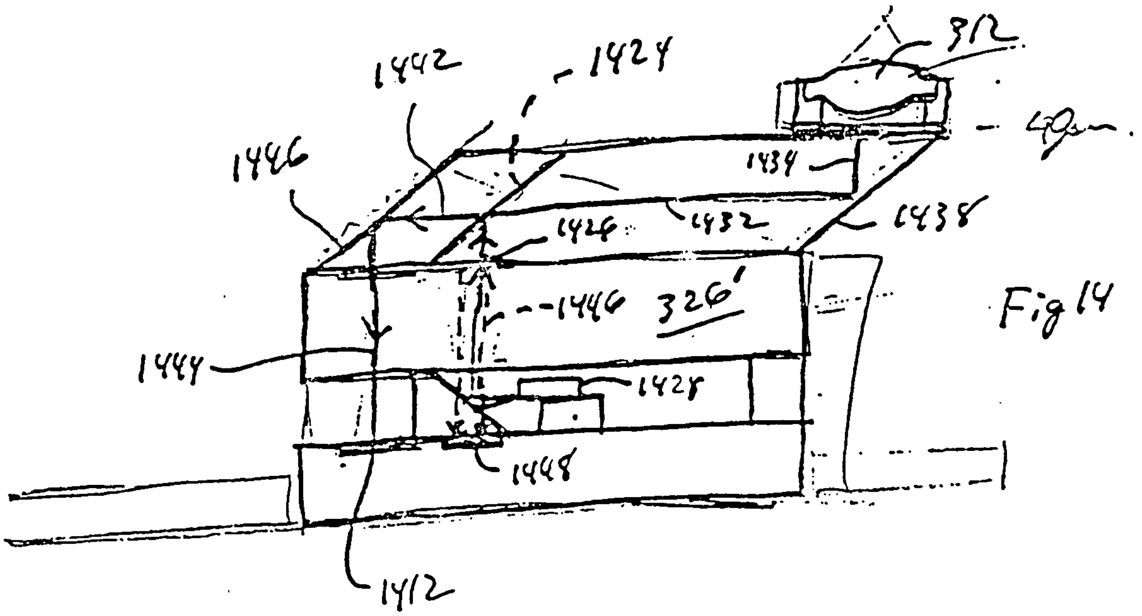

1442
1424
312
1446
40μm
1434
1432
1438
1426
1446
326'
1444
1428
1448
1412

Fig 14

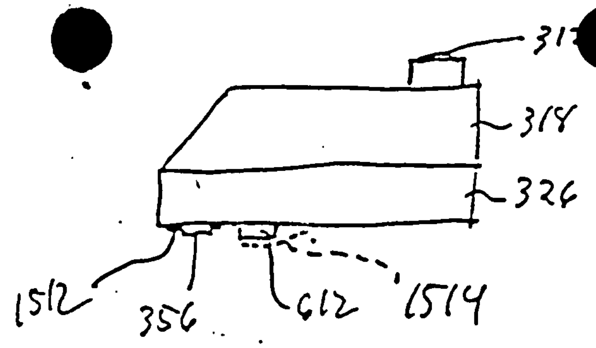


Fig. 15

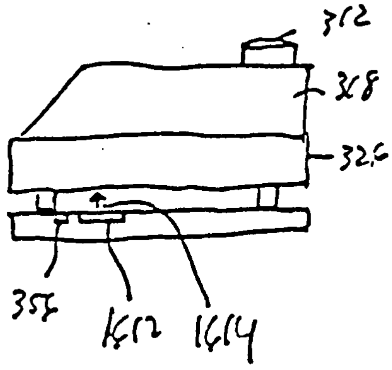


Fig 16

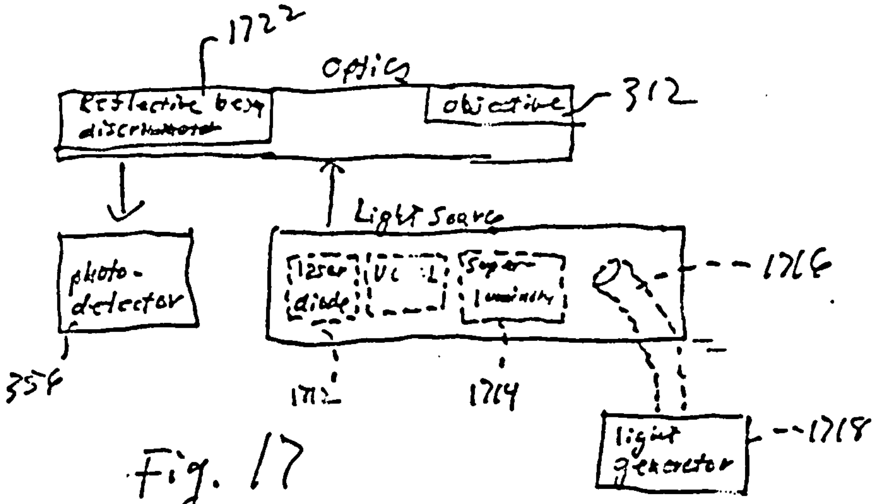
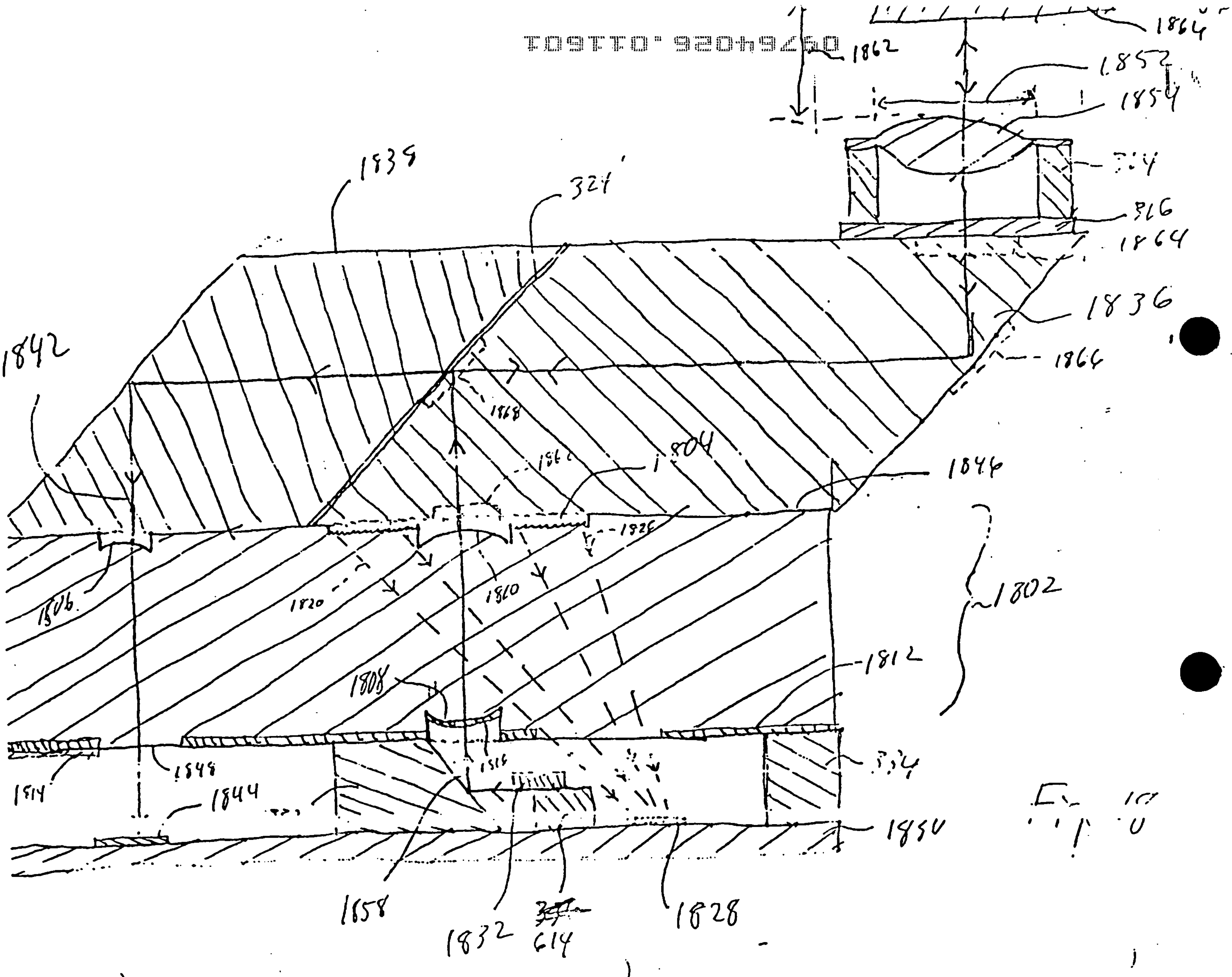


Fig. 17


1864
1862
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1854
324
316
1864
1836
1866
1839
324
1842
1868
1866
1804
1826
1846
1802
1806
1820
1810
1812
1808
1816
1848
1814
1844
324
1850
1858
1832
~~314~~ 614
1828

Fig 18

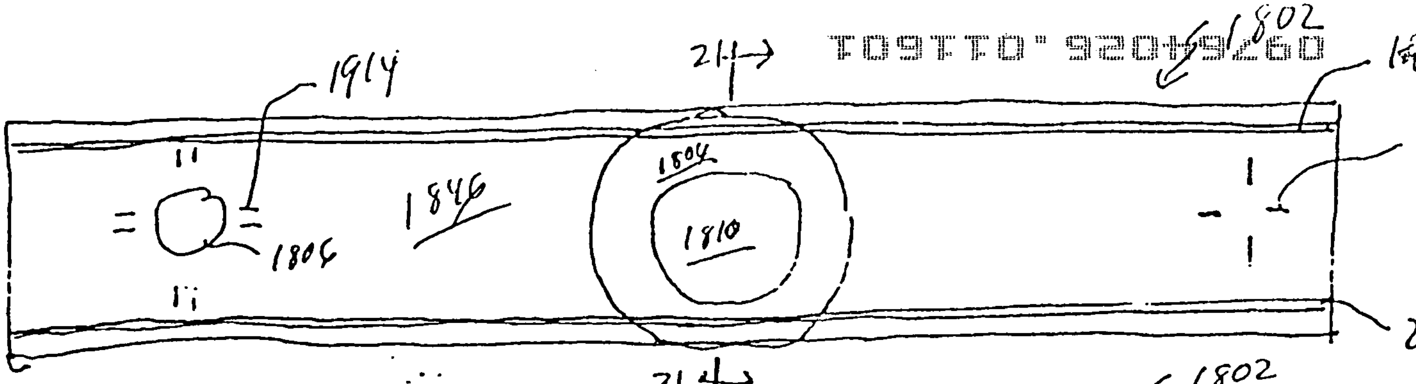


Fig 19

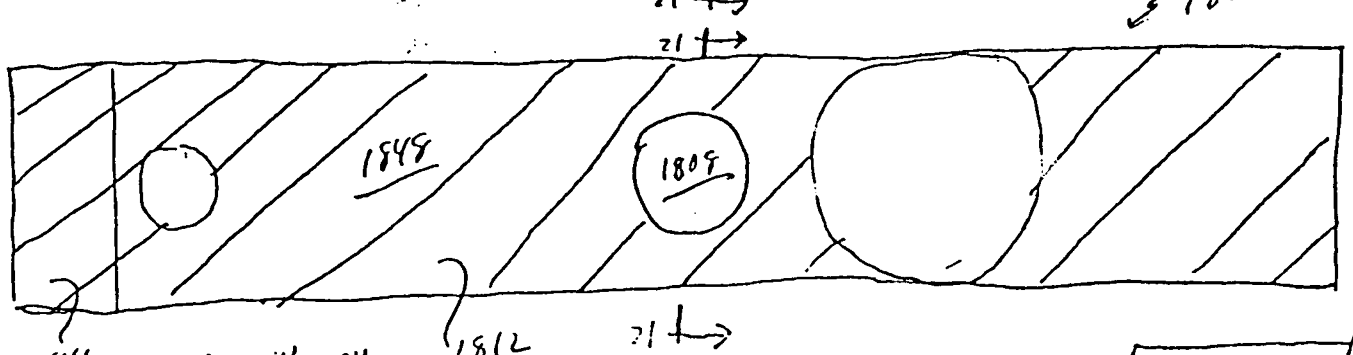


Fig 20

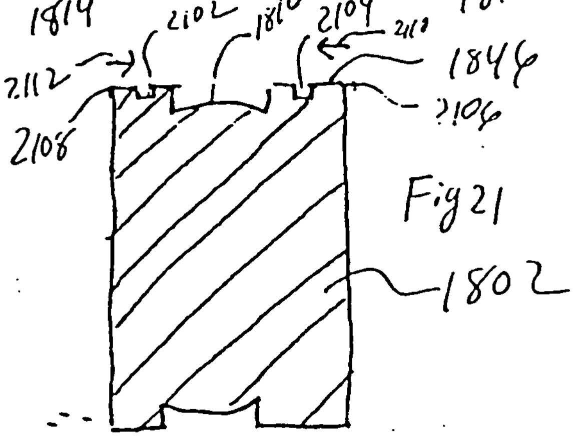


Fig 21

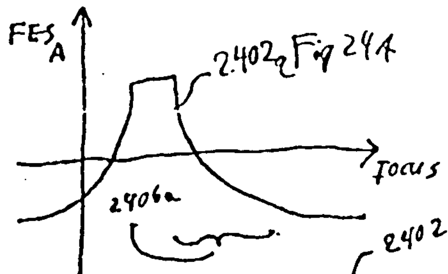


Fig 24A

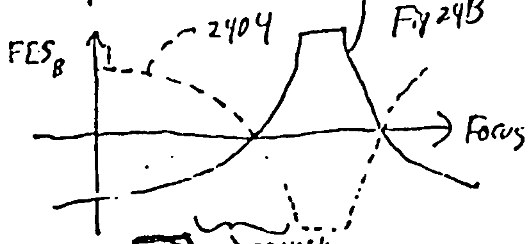


Fig 24B

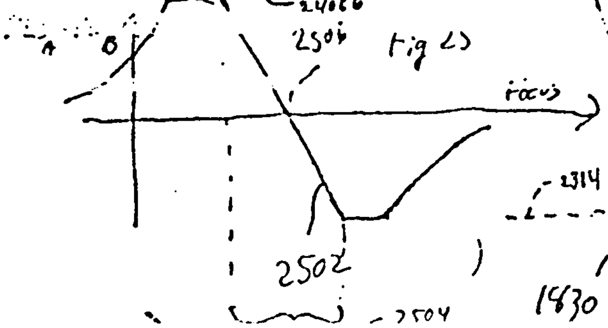


Fig 25

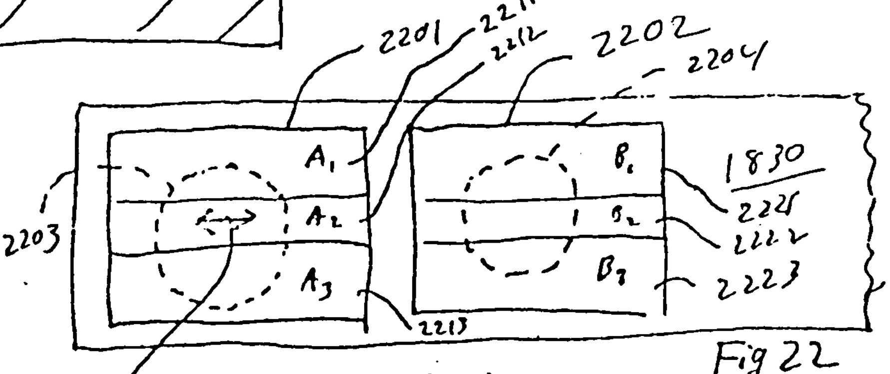


Fig 22

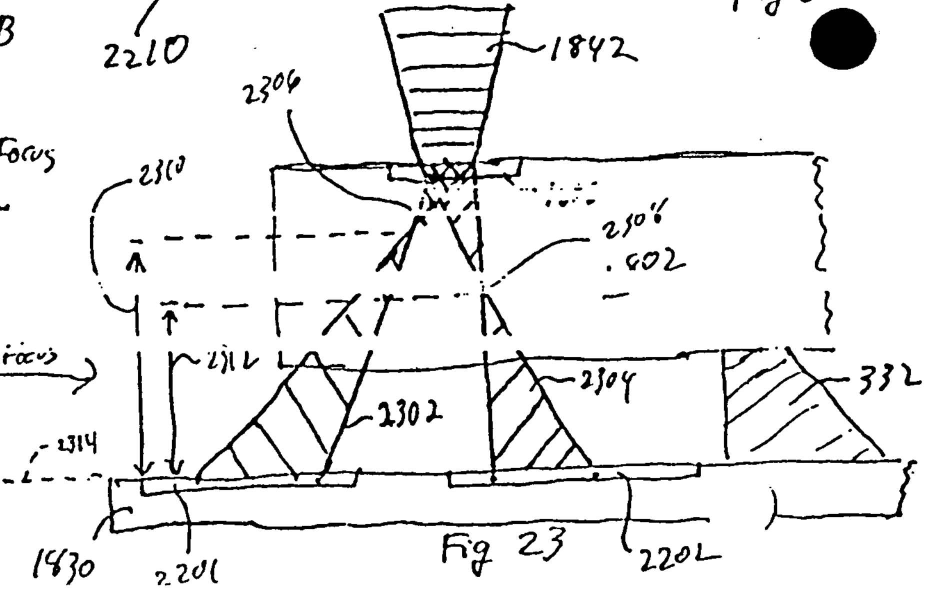


Fig 23

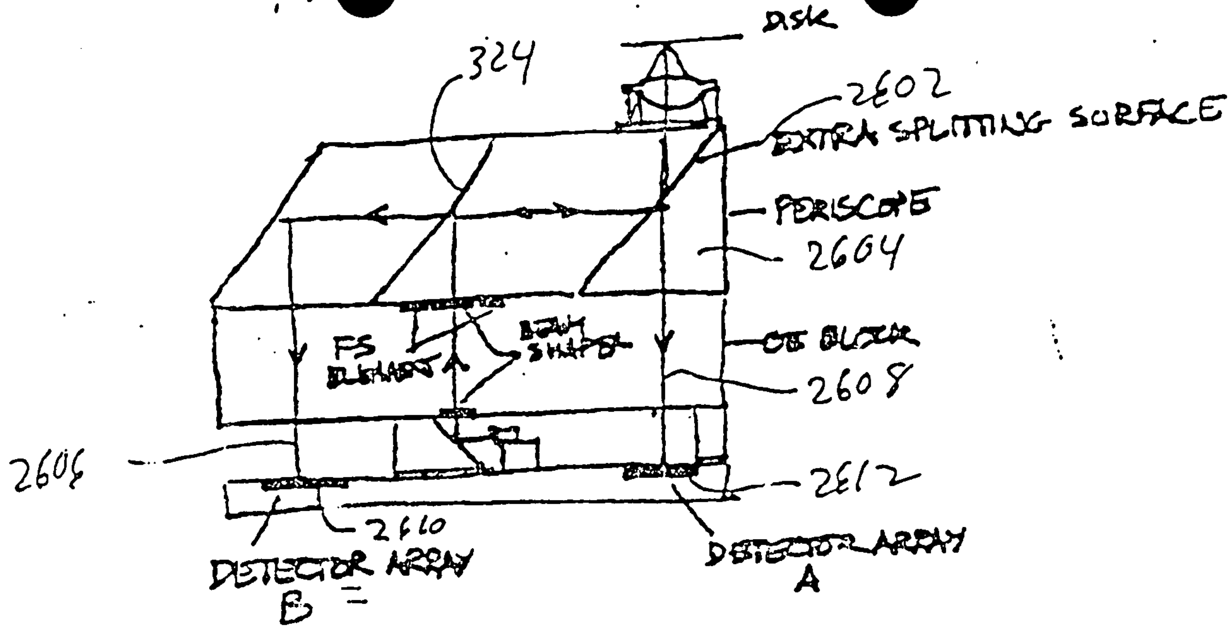


FIG. 26 IMPROVED LAYOUT, REQUIRING NO SCB.

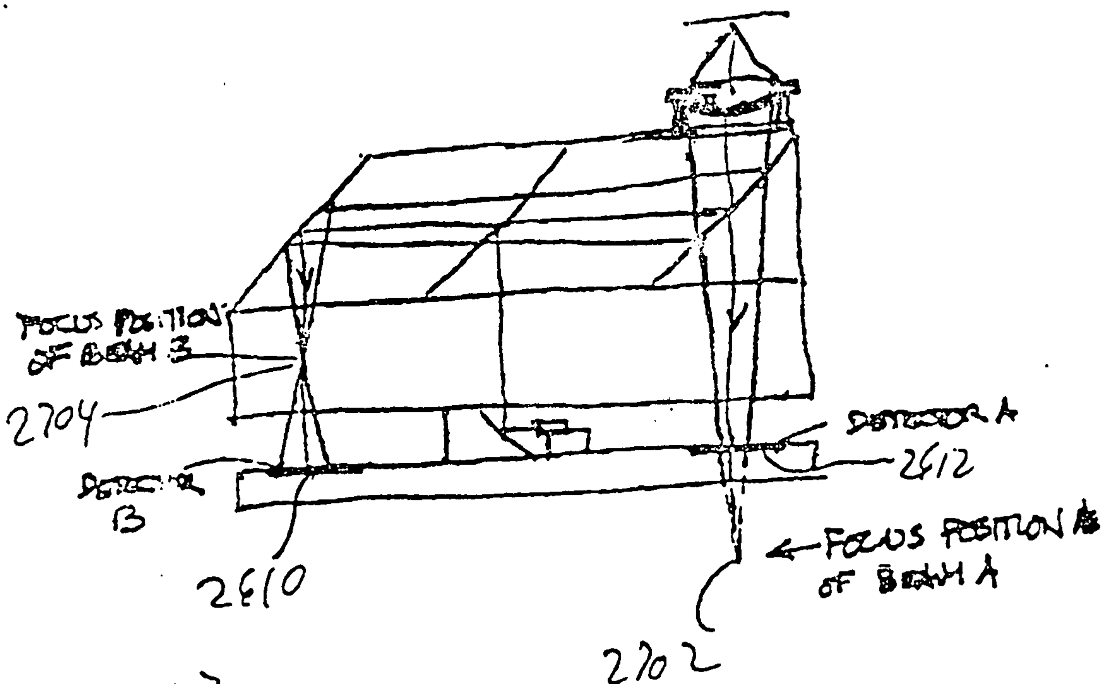


FIG. 27 IMPROVED LAYOUT, SHOWING BEAMS IN A DIFFERENTIAL SPOT SIZE MEASUREMENT FOCUS SENSING SCHEME.

Fig 28A

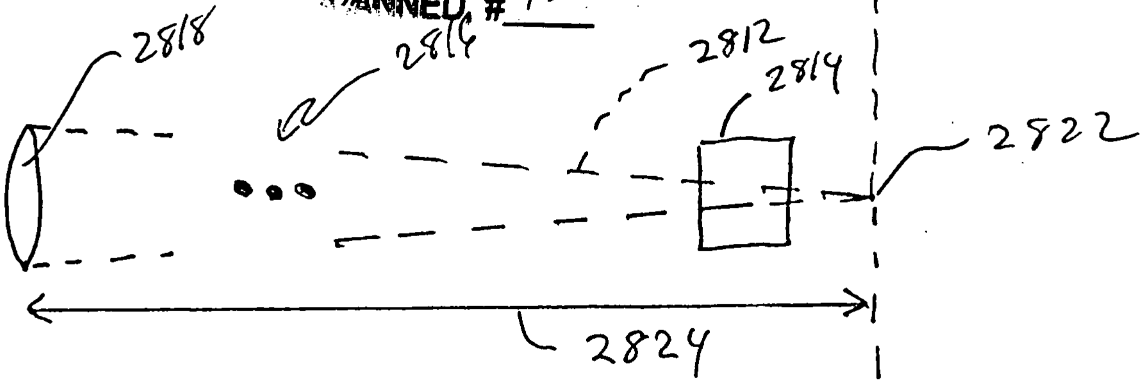


Fig 28B

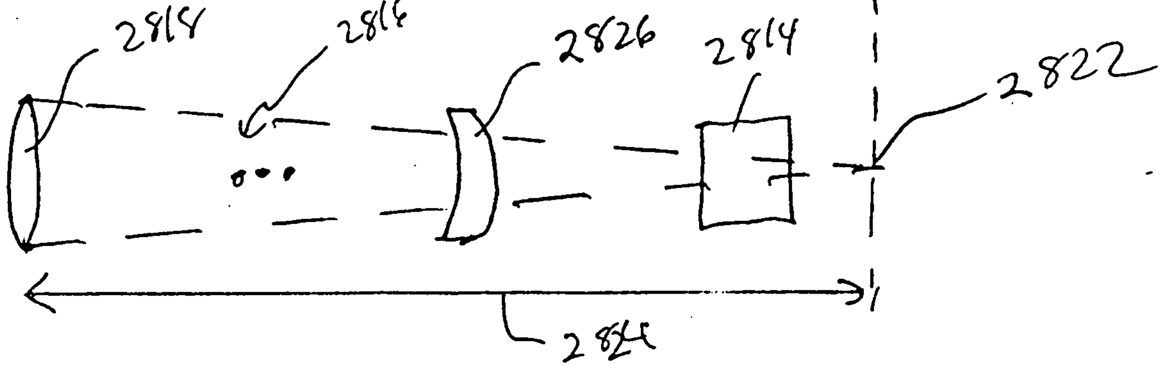
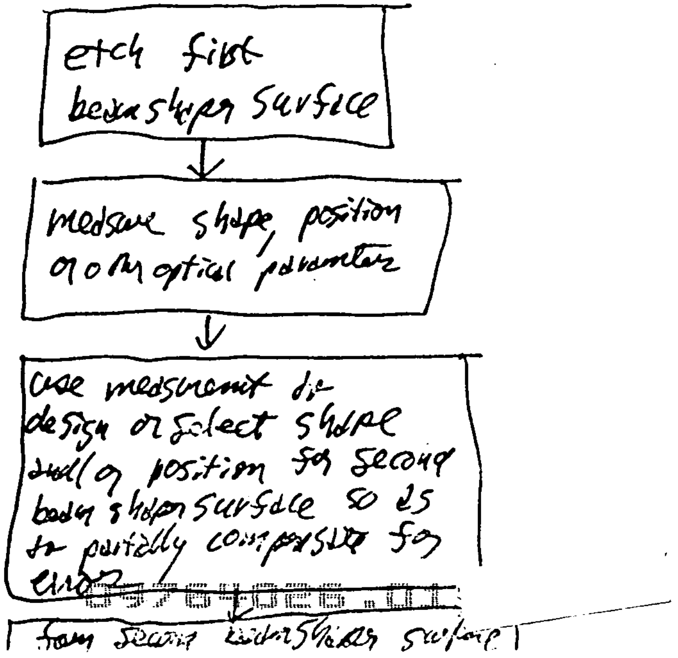


Fig 29



BEAM SHAPER EQUATION

SURFACE 1

$C_{20} := -0.39159485$

$C_{02} := 1.93044042$

$C_{40} := 0.33426195$

$C_{22} := -10.209495$

$C_{04} := -6.7032532$

$$\mathrm{Sag}(X,Y) := C_{20}\cdot X^2 + C_{02}\cdot Y^2 + C_{40}\cdot X^4 + C_{22}\cdot X^2\cdot Y^2 + C_{04}\cdot Y^4$$

$Y := 0, 0.01 .. 0.086$

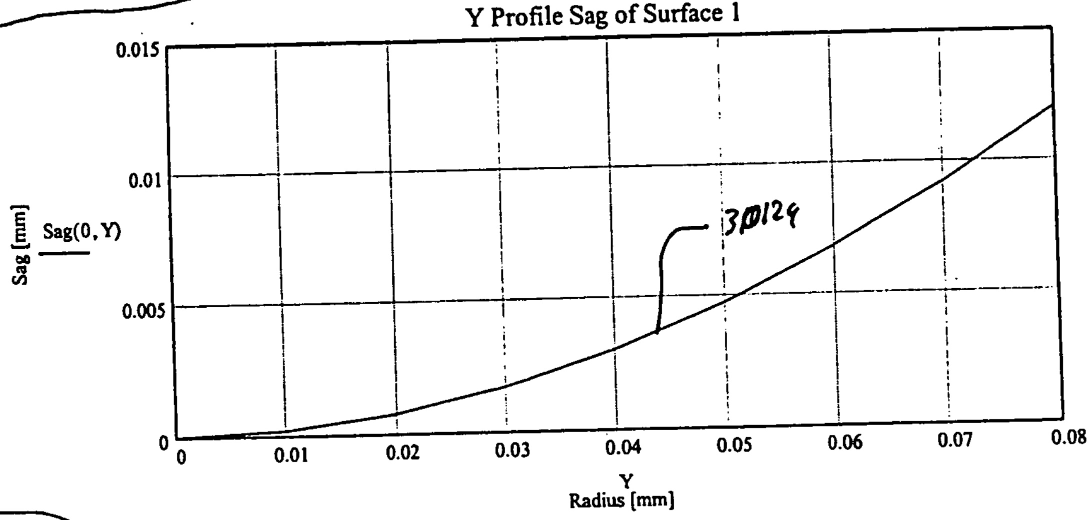


Fig 30A

$X := 0, 0.01 .. 0.086$

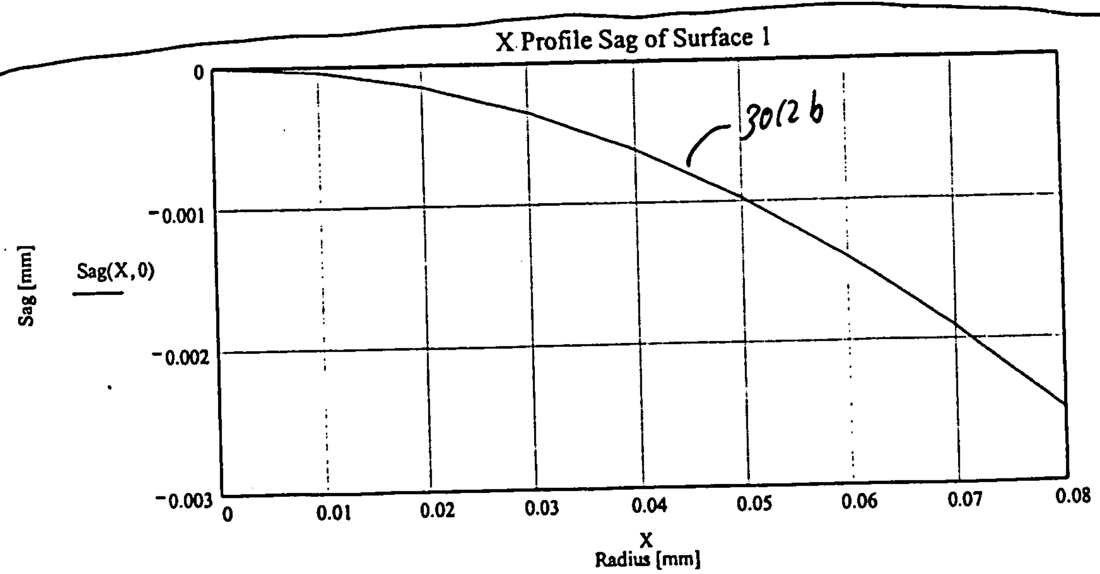


Fig. 30B

SURFACE 2

$C_{20} := -0.052783359$

$C_{02} := 0.63270121$

$C_{40} := 0.034762591$

$C_{22} := -0.91998271$

$C_{04} := 1.7905847$

$$\mathrm{Sag}(X,Y) := C_{20}\cdot X^2 + C_{02}\cdot Y^2 + C_{40}\cdot X^4 + C_{22}\cdot X^2\cdot Y^2 + C_{04}\cdot Y^4$$

$Y := 0, 0.01 .. 0.130$

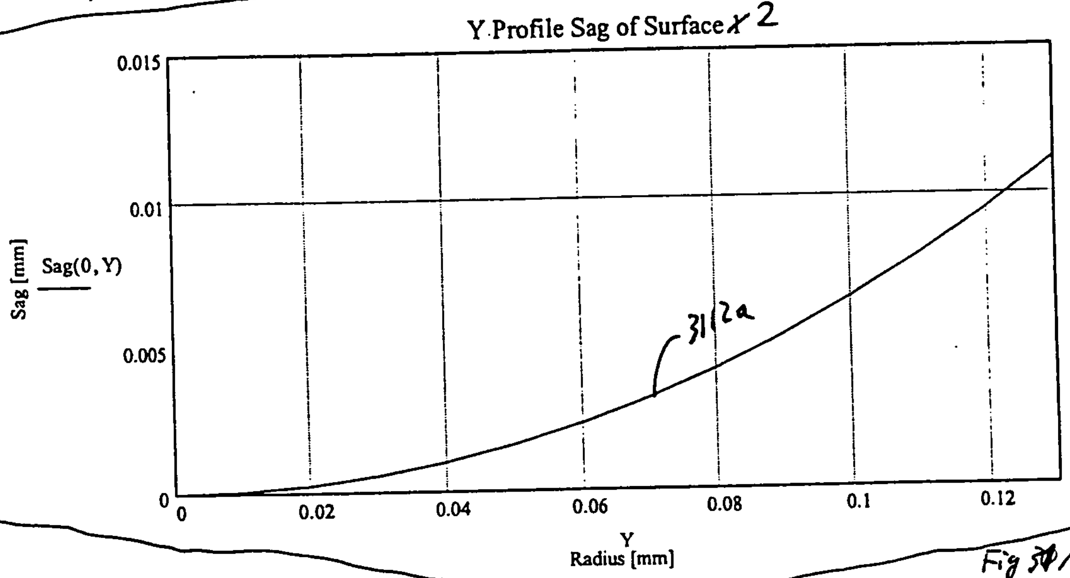


Fig 30A

$X := 0, 0.01 .. 0.130$

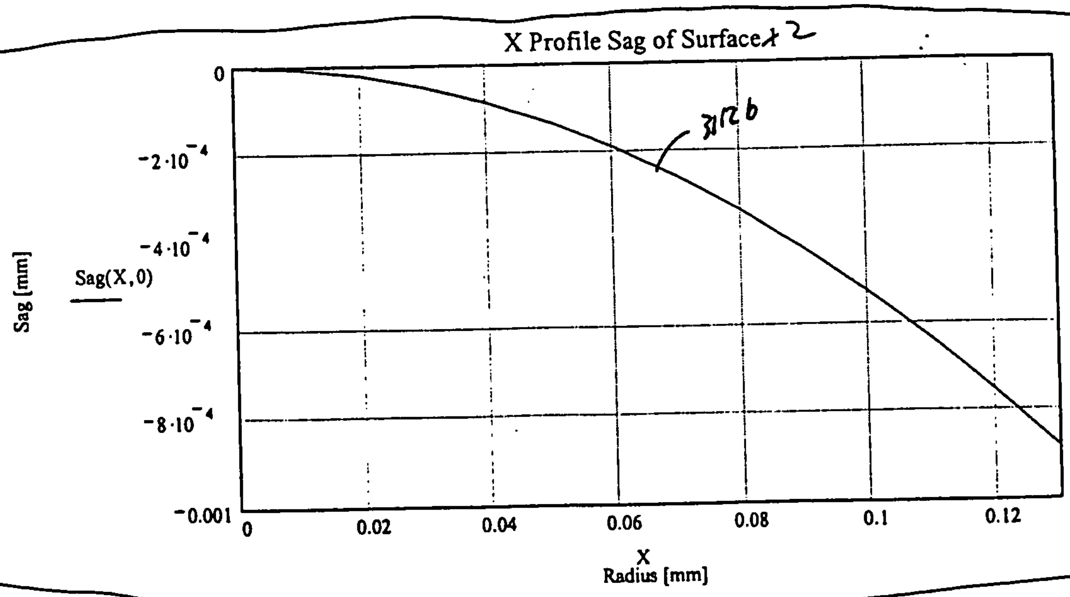


Fig 30B

Example of Compensating error in the 1st surface by change in the 2nd surface

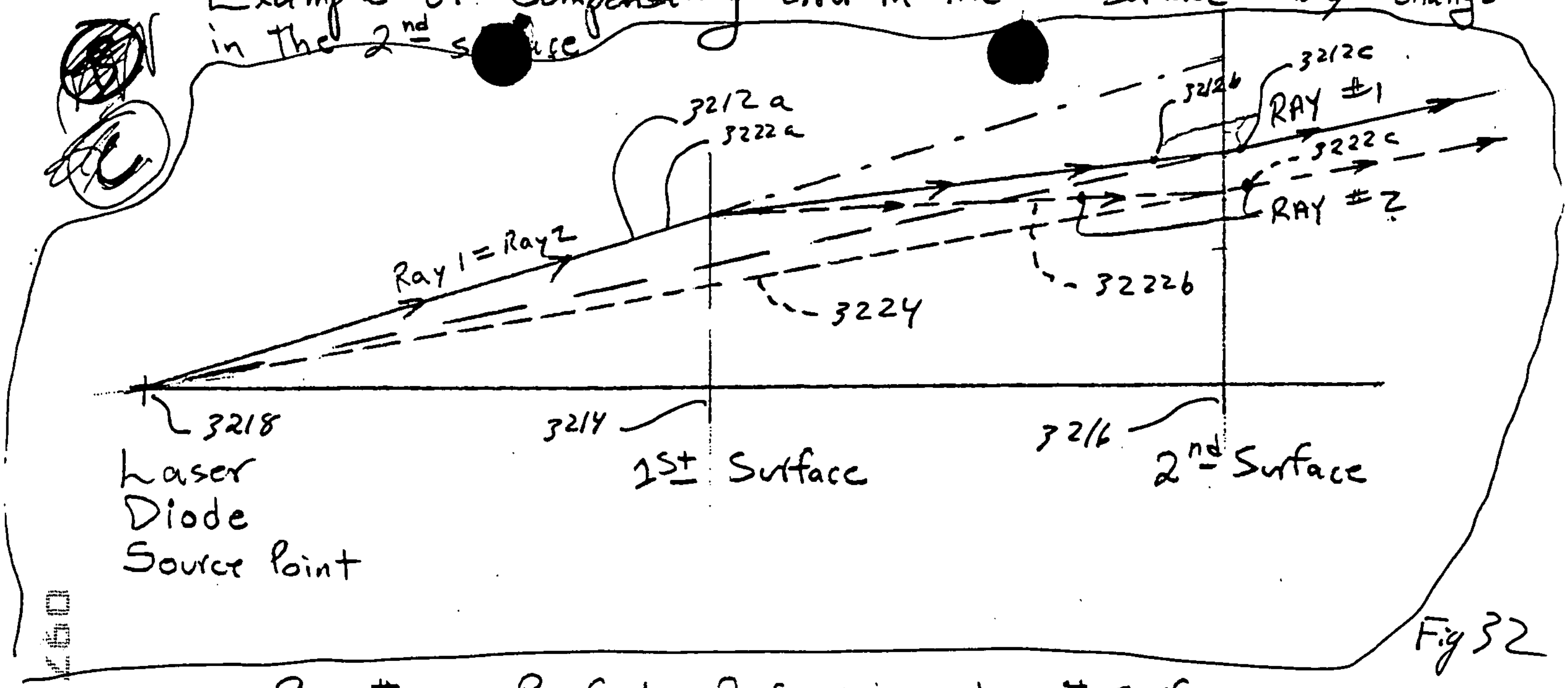


Fig 32

RAY #1: Perfect Refraction at 1st Surface
Perfect Refraction at 2nd Surface
Source point unchanged

RAY #2: Imperfect Refraction at 1st Surface. Ray 2 deviates more than Ray 1.

Compensate with imperfect refraction at 2nd Surface. Ray 2 deviated such that the

Source point is unchanged